

EVALUATION OF CARDANOL RESINS AS CALCIUM NAPHTHENATE INHIBITOR

Rocío Macarena Moyano Dip^a, Natalia Borges^a, Elizabete F. Lucas^{a*}

^a Authors affiliations: Instituto de Macromoléculas Professora Eloísa Mano – IMA/Universidade Federal do Rio de Janeiro - UFRJ, Campus do Fundão, Rio de Janeiro –RJ – mmoyano@ima.ufrj.br,
*elucas@ima.ufrj.br

ABSTRACT

The deposition of calcium naphthenate is an increasing problem in the crude oil production^{1,2}. A current solution is to inject a mixture of chemicals to the well stream^{3,4}. Therefore, the aim of this work is evaluate cardanol/formaldehyde resins as inhibitors of calcium naphthenate formation. The polymers were synthesized with different monomers ratios (1:0.7; 1:0.8 and 1:0.9, cardanol/formaldehyde, respectively) and quantities of catalyst, in the attempt of obtain different molar masses. Synthesized polymers and cardanol were characterized by NMR and FTIR. And the molar masses were determined by SEC. To assess the performance of the resins as naphthenate inhibitors a biphasic mixture test was used. An aqueous solution of different ions, including Ca⁺², was prepared to simulate the production water. The naphthenic acids and the polymers were dissolved in a toluene/n-decane mixture (8:2 V/V). The two phases were mixed to observe the characteristics of the emulsion and precipitated solid. In addition, the naphthenate film formed in the oil/water interface was studied by shear rheology using Du Nöuy ring geometry. For this test, the phases were placed in contact and the ring kept in the interface. Some of the cardanol/formaldehyde resins caused changes on the formed emulsion. The rheological tests have shown that the presences of the polymer produce modifications on the properties of the naphthenate interfacial film.

Acknowledgement: CAPES, CNPq, CENPES.

References

- ¹ Magnusson H.; Hanneseth A. M. D.; Sjöblom J. J. *Disp. Sci. Technol.* **2008**, *29*, 464.
- ² Nordgård, E. L.; Hanneseth, A. M. D.; Sjöblom, J. J. *Disp. Sci. Technol.* **2010**, *31*, 668.
- ³ Hanneseth, A. M. D; Brandal, O.; Sjöblom, J. J. *Disp. Sci. Technol.* **2006**, *27*, 185.
- ⁴ Gallup, D.L. Paper presented at 6th SPE Oilfield Scale Symposium. Aberdeen, U.K., **2004**, SPE 87471.